QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Nature of the Red Blood-Corpuscle.*—Dr. Beale in the first place points out the remarkable fact of the different crystallization of the colouring matter of the red blood-corpuscles, even in animals nearly allied, confirming their inherent specific differences. He believes that the red colouring matter of the blood-corpuscle was once in the condition of living germinal matter, having particular specific characters from different existing conditions and inherent powers, *vital power.* The colourless corpuscles and the colourless nuclei of the red corpuscles consist of matter in a living state. The various shapes of blood-corpuscles are due to their consistence and movements, and the action of fluids and gases upon them; they are not structural characteristics. Dr. Beale disproves the existence of a cell-wall to a red blood-corpuscle in various ways—that they sometimes change form without pressure, or portions are detached from them as if they were of a treacly consistence; that similar changes may be produced by a gentle heat—very fine threads are, as it were, drawn out from the red viscid matter; that if frog's, or other large corpuscles are suddenly compressed, many will be subdivided into smaller ones, instantly spherical, without appearance of ruptured cell-wall or escape of contents; that a nucleus may pass completely through the coloured material; and finally, that the corpuscles of the blood of the guinea-pig soon break up into very small rounded portions, which show angles, and at last become distinct tetrahedral crystals. The whole of the soft, red, viscid matter of which the blood-corpuscle was composed, became crystalline. One corpuscle may form one crystal, or one large crystal may be formed out of several corpuscles. As this change occurs immediately blood is drawn, and seems to affect the youngest corpuscle, it is probably to be explained by the tendency to form processes which germinal matter often exhibits when stationary. When water is added to blood-corpuscles they swell, but they do not burst; they become very transparent, and doubtless a certain quantity of the fully formed colouring matter is dissolved out; but as the water evaporates, the corpuscles again assume their ordinary characters, many being only paler than before. . . . . The red corpuscle exists first as a very small spherical mass of transparent colourless germinal matter, which continues to grow for a time, and gradually undergoes conversion into the red colouring matter, &c.—*Quarterly Journal of Microscopical Science,* 1864.

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2. *Experimental Inquiry into the Changes in the Composition of the Blood, induced by Inanition.*—The subjects of Dr. Panum's investigations were dogs, and he believes that he has proved that in complete inanition no essential or remarkable alteration is produced either in the proportion of blood generally to that of the body, or in the relative proportions of the chief constituents of the

blood (that is to say, of the corpuscles and fibrin) to one another. No doubt the absolute quantity of blood constantly diminishes during the progress of starvation, but it certainly does not diminish in a greater proportion than the whole mass of the body, and the different opinion held by Chossat and by Bidder and Schmidt is due to the incorrect method employed by them to exhibit these relations. This maintenance of the normal relative proportions of the chief constituents of the blood in complete inanition receives its full significance when it is shown that it still exists, though the animal is allowed to drink at will, for it follows that the materials destined for the nutrition of the tissue which have been absorbed from the intestine, as well as oxygen and the products of disintegration—carbonic acid and urea—only transiently form constituents of the blood; with deficient supply, the formation of the tissues, the so-called progressive metamorphosis is soon arrested, for the mass of the solid constituents of the blood do not, to any extent at least, undergo alteration, and are thus unable to furnish directly the requisite material. Consequently the blood, as a whole, is not the material of nutrition, but is in reality only a means of transport for nutrient compounds—in other words, an organ occupying an intermediate place between the tissues and the substances absorbed from the intestine. Hence, also, the important conclusion may be deduced that neither the blood-corpuscles nor the fibrin is the true or essential material of nutrition; for their quantity in relation to the total body-weight does not diminish in the proportion which would occur if they were consumed as pabulum for the nourishment of the tissues. On the other hand, the constant, though not very considerable, diminution of the solid, and especially of the albuminous constituents of the serum, renders it very probable that a portion of these is to be regarded as the material really consumed in the nutrition of the tissues.—*Brit. and For. Med.-Chir. Rev.*, July, 1864, from *Virchow's Archiv*, Bd. xxix., 1864.

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3. *Degeneration and Regeneration of Nerves.*—M. VULPIAN has lately discoursed on this very interesting subject in his lectures at the Museum of Natural History in Paris. The physiological property of motor and sensitive nervous fibres is the property of undergoing certain modifications under the influence of some agent. This property belongs to the nerve-fibre, independent of the nervous centres. "I am thoroughly convinced," says M. Vulpian, "that the origin of this property of the nerve is to be sought for in the nerve-fibre itself. Our classical works tell us that the nerves borrow their force or property from the nervous centres; but this is a complete error. If a motor nerve received its properties from the spinal marrow, it ought to lose them when cut; but it does nothing of the kind; for, when the peripheric end of the cut nerve is excited, the muscles contract; and more than this, when its nerve-force has been exhausted by long and continued excitation, it recovers its force under repose. It is strange that this simple demonstration has not convinced every one.

In considering the phenomena attending the disappearance of the nerve-force, we have to observe—1. The duration of the excitability of the nerve after section; 2. The mechanism of its disappearance.

In 1838, Müller investigated the first of these questions—the duration of the excitability of the nerve; and he concluded that it disappeared after some weeks. In 1840, Gunther and Schön made similar observations; and in 1841, M. Longet obtained similar results. It was also noted, that when, after section, the nerve had lost its properties, the muscle to which it was distributed still preserved its power of contractility—showing the independence of muscular irritability. Brown-Séquard and Martin Magron have seen muscular irritability last longer than two years in certain animals, although every trace of excitability had disappeared in the nerve which had been cut and passed into the muscles. Another proof of the fact that muscular contractility is independent of nervous excitability has been given by M. Bernard. He has demonstrated that when the action of the motor nerves over the muscles is absolutely arrested, muscular irritability, contractility, may still exist.

The question as to how the nerve loses its properties is of the highest interest, and its answer will give us a key to some of the most interesting phenomena which have exercised the sagacity of physiologists.